PARATYPES. — *D.J. Du Puy, Lewis & Schrire M568*, N Madagascar, Antsiranana (Diégo Suarez) Province, Ankarana Massif, north-east of the village of Ambondromifehy, Mahory forest, 12°52'S, 49°14'E, 28 Nov. 1992, st. (K, P); *Vaucoulon 65*, Province de Diégo Suarez [Antsiranana], Massif de l'Ankarana, 11 Sep. 1989, st. (P); *Vaucoulon 142*, ibid., 6 Oct. 1990, old fr. (P); *Vaucoulon 319,* ibid., 23 Nov. 1990, st. (P).

E. ankaranensis is only known from two fertile and three sterile specimens (the description of the pods being taken from *Vaucoulon 142*, and the leaves from *Du Puy et al. M568*), all from the Ankarana Massif in northern Madagascar. It occurs in open deciduous woodland and scrubland, on exposed limestone cliffs, boulders and "tsingy" (eroded karst and pinnacles), at ca. 100-200 m altitude. The flowering time is recorded as March and April.

It is very distinctive in its flower colour, its small, glabrous, spathaceous calyx and its unusual papery, inflated, narrowly winged pods. The pod of *E. ankaranensis* somewhat resembles that of *E. greenwayi* Verdc. from E Africa (the only species in section *Tripterolobus* Barneby & Krukoff of subgenus *Erythrina*), but this latter differs in many important characters including its deeply 5-lobed leaflets, its campanulate, 2- or 3-lobed calyx, its wings exceeding the keel, and its free keel petals. *E. ankaranensis* also superficially resembles *E. stricta* Roxb. from SE Asia (section *Suberosae* Krukoff of subgenus *Erythrina*), *E. stricta* differing in its keel shape, its entirely different pods without wings, its leaflets without lobes and its scarlet flowers.

Erythrina hazomboay Du Puy & Labat, **sp. nov.**

Species distincta indumento pseudoracemi calycisque cum nigrescentibus simplicibusque pilis, calyce spathaceo et purpureo-nigro in alabastro, alis minutis 7 mm longis, 2 mm latis carena brevioribus, petalis vexilli non connatis.

TYPE. — *R. Decary 18145*, E Madagascar, Fanovana (E Perinet), 16 July 1942, fl. (holo-, P).

A small tree to ca. 6 m tall, flowering when the foliage is present; twigs thick, with many small prickles, finely tomentose at the tips only, soon glabrescent. Leaflets 3, elliptic to triangular-ovate, 6-17 × 4.5-12 cm, truncate to broadly cuneate basally, the apex shortly tapering, glabrous, coriaceous, distinctly 3-veined from the base; petiole without prickles; glandular stipels large and elongated along the petiole.

Pseudoracemes ca. 17 cm long, shortly pedunculate, densely tomentose with short, dark brown hairs when young; bracteoles acicular, ca. 3 mm long, caducous. Flowers 40-45 mm long, red. Calyx ellipsoid and purple-black in bud, splitting behind the standard and becoming spathaceous, 25-30 mm long, densely tomentose with blackish hairs. Standard broad, elliptic, ca. 35-45 × 35-40 mm, truncate apically, with a very short claw; wings minute and much smaller than the keel, oblong, 7 × 2 mm, enclosed by the calyx; keel obovate, ca. 17 × 12 mm, the petals free. Stamens 32-45 mm long; anthers large, 10-12 mm long. Ovary densely woolly with long hairs.

Pods with a stipe ca. 15 mm long, elongate-oblong, slightly compressed, robust, ca. 10 × 2.5 cm, thickened along the margins, glabrous, very coriaceous, with raised veins, appearing indehiscent, with 2 seeds (only one pod available). Seeds ellipsoidal, 18 × 12 × 12 mm, the hilum 7 mm long.

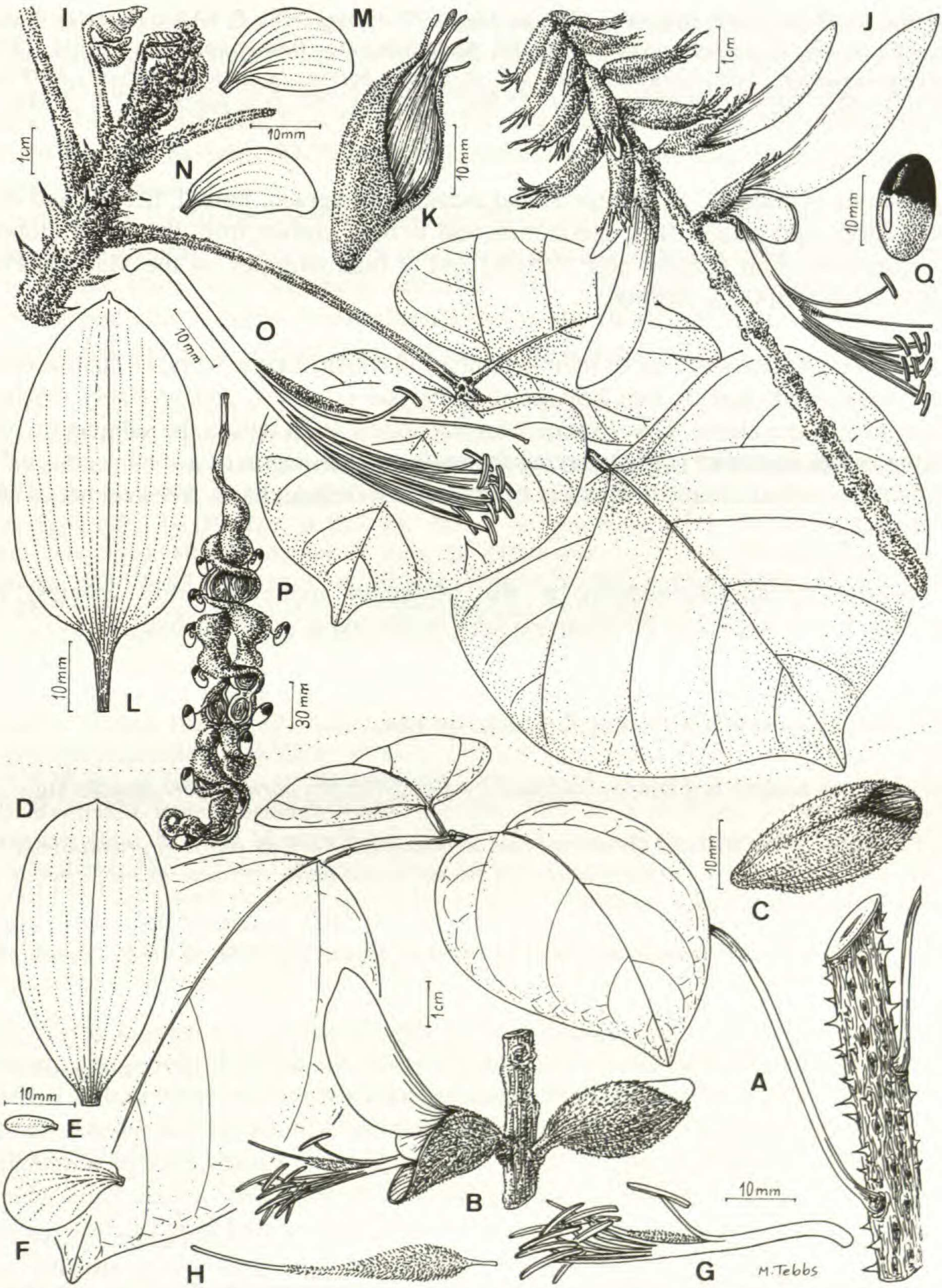

Fig. 2. — **Erythrina hazomboay** Du Puy & Labat: **A**, habit; **B**, flower and inflorescence axis; **C**, bud; **D**, standard petal; **E**, wing; **F**, keel; **G**, staminal sheath; **H**, ovary. (All drawn from *Decary 18145*, holotype, P). — **Erythrina madagascariensis** Du Puy & Labat: **I**, habit; **J**, apex of inflorescence and flower; **K**, calyx; **L**, standard petal; **M**, wing; **N**, keel; **O**, staminal sheath and ovary; **P**, pods; **Q**, seed. (I, P, Q, drawn from *D.J. & B.P. Du Puy & Andriantiana M516*, K; J-O, from *Phillipson 2261*, K).

PARATYPES. — *Morat 4949*, Masoala, 1000 m, May 1975, imm.fl. (K, P, TAN); *Réserves Naturelles 9*, Antalaha, s.d., st. (P); *Service Forestier 63-R-230*, Andrambovato, Tolongoina, Fort-Carnot, 1951, st. (P, TEF); *Service Forestier 22-SF*, Andrambovato, s.d., st. (TEF); *Service Forestier 14835-SF*, Andrambovato, Fort-Carnot, 15 Mar. 1955, fr. (P, TEF); *s.coll.*, 12 BA., *P0008342*, N° de la parcelle, C.A., 3 Mar. 1950, fl. (P).

E. hazomboay is endemic to eastern Madagascar, in evergreen, humid, lichen- and moss-rich forest on hilltops and ridges. It is uncommon and is only known from the upper slopes of the eastern escarpment (Fort Carnot; near Perinet) and at high altitudes on the Masoala Peninsula, occurring at ca. 800-1000 m altitude.

This species is characterised by its indumentum of blackish, simple hairs, its spathaceous calyx, its minute wing petals and its free keel petals. The pod is robust, and probably reaches larger dimensions than given above. This species does not appear to fit within the subgeneric classification of KRUKOFF & BARNEBY (1974), having the unique combination of a spathaceous calyx splitting behind the standard, simple or sparsely branched (not stellate) hairs, free keel petals and minute wing petals.

The specific epithet *hazomboay* is the Malagasy name for this species, meaning crocodile-wood, in reference to the sharp prickles on the twigs and branches.

Erythrina madagascariensis Du Puy & Labat, **sp. nov.**

E. perrieri sensu Krukoff & Barneby, Lloydia 37: 439 (1974), *pro parte majore*, non R. Vig.

Species distincta dense farinoso indumento cum stellatis pilis, floribus rubris et grandissimis 55-80 mm longis, calyce spathiformi apice apendiculato, alis florum aequantibus carinam, moniliformibus leguminibus, rubris nigrisque discoloribus seminibus.

TYPE. — *Bosser 9732*, W Madagascar, environs de Morondava, Sep. 1956, fl. (holo-, P; iso-, K, MO, P, TAN).

A small deciduous tree or large shrub 3-10 m tall, flowering and fruiting before the leaves appear; trunk swollen, the diameter at breast height 15-25 cm, the bark silver grey, the outer layer easily scraped off and green beneath, with robust prickles; twigs thick, pithy within, densely covered in sharp, strong, black prickles 3-10 mm long, floccose with dense, pale brown, stellate hairs. Leaflets 3, broadly triangular-ovate, 6.5-22 × 7-24 cm, truncate basally, shortly acuminate apically, not lobed, soon glabrescent above, densely floccose beneath with stellate hairs which can be easily scraped off, eventually partially glabrescent, strongly 3-veined from the base; petiole often with a few prickles; glandular stipels ovoid.

Pseudoracemes 25-50(-80) cm long, robust and many-flowered, the flowers in groups of 3, the axis floccose with dense, pale brown, stellate hairs; bracteoles minute, ovate, ca. 1.5 mm long, caducous. Flowers very large, 55-80 mm long, the standard bright red becoming green at the base, the wings and keel orange-brown, the stamens bright red. Calyx fusiform in bud with 1 thickened and 4 slender apical appendages 3-8 mm long, splitting to near the base and becoming spatha-

ceous, held to one side of the flower, 25-35 mm long, the apical appendages persistent, floccose with dense, pale brown, stellate hairs which rub off as a powder. Standard petal oblong-elliptic, 50-75 × 20-30 mm, obtuse apically, with a short claw; wings slightly longer than the keel, crescent-shaped, 14-20 × 5-8 mm; keel 12-18 × 7-10 mm, truncate apically, the petals free. Stamens exserted far beyond the keel, 50-70 mm long; anthers 4.5-5 mm long. Ovary stipitate, floccose with dense, white, stellate hairs.

Pods with a stipe 25-50 mm long, moniliform and strongly constricted between the seeds, sometimes coiled into a spiral, 13-30 × 1.7-1.9 cm, beaked apically, floccose with dense, yellow-brown, powdery, stellate hairs, splitting along one side, with 6-16 seeds which are persistent on the margin of the pod after it opens. Seeds ellipsoidal (11-)13-16 × (7-)8-9 × (7-)8-9 mm, bicoloured bright orange-red and black, glossy, with a white hilum 5-6 mm long.

PARATYPES. — MADAGASCAR: *Académie Malgache s.n., P0008352*, W et NW, Oct. 1904, fr. (P); *Baron 6829*, s.loc., s.d., fr. (K); *Baron 6941*, s.loc., s.d., fl. (K); *Basse s.n., P0008354*, environs de Manja, 23 Sep. 1931, fl. (P); *Basse 23*, environs de Manja, 23 Sep. 1931, fl. (P); *Decary 8240*, Maintirano, 29 Aug. 1930, fl. (P, TAN); *Decary 8293,* environs de Tsitampiky, 4 Oct. 1930, fl. (P); *Douliot s.n., P0008361*, forêt de Manarivo, Sep. 1891, fl. (P); *D.J. & B.P. Du Puy & Andriantiana M516*, W Madagascar, Province of Mahajanga (Majunga), Menabe region, N Belo sur Tsiribihina, ca. 20 km SW Bekopaka, ca. 2 km N Antsakoazato, 19°16'S, 44°43'E, ca. 40 m, 30 Mar. 1990, fr. (K, MO, P, TAN, WAG); *D.J. Du Puy & Lewis M561*, N Madagascar, Antsiranana (Diégo Suarez) Province, near Irodo, ca. 20 km E Sadjoavato, 12°39'S, 49°30'E, 21 Nov. 1992, fr. (K, MO, P, PRE, TAN); *Grandidier 29*, Bohiré, 1879, fl. (P); *Grevé 47*, s.loc., s.d., fr. (MO, P); *Humblot 435*, s.loc., s.d., fl. (P); *Jardin Botanique de Tananarive 6538,* Ambahivahibe, Diégo Suarez, 3 July 1944, fl. (P); *Keraudren & Aymonin 25482*, environs de Diégo Suarez, sud d'Orangea, Andovokonko, 24 Nov. 1970, fr. (P); *Labat, Deroin, Edmond, Rabarison & Laivao 2221*, env. d'Antsalova, Berano (Réserve Naturelle 9), 18°28'S, 44°42'E, 100-200 m, 28 Nov. 1992, fr. (K, MO, P, TAN, WAG); *Léandri 233*, Tsingy de Bemaraha (9e Réserve), 1932/1933, fl. (P); *Louvel 260*, s.loc., 50-200 m, Oct.-Nov., fl., fr. (P); *Morat 824*, route Besalampy-Maintirano, Oct. 1964, fl., fr. (P, TAN); *Perrier de la Bâthie 4741*, W Madagascar, Baie du Mont Mirafy (Bassin du Maharivo, au sud de Morondava), Aug. 1911, fl. (P); *Perrier de la Bâthie 4872, P0008378*, Ouest, Besalampy (Milanja), Nov. 1913, fr. (P); *Perrier de la Bâthie 4872, P0008379*, s.loc., bords de la mer dans les rocailles ou les sables, mais surtout au voisinage des habitations, July 1914, fr. (P); *Phillipson 1801*, Province of Tuléar, near Beza Mahafaly Reserve, along banks of Sakamena River, 23°39'S, 44°38'E, 13 May 1987, st. (MO, P, TAN); *Phillipson 2261*, Province of Mahajanga, along road from Antsalova SW to Masoarivo, near crossing of Bemamba marshes, 18°50'S, 44°27'E, 30 m, 25 Aug. 1987, fl. (K, MO, P, TAN); *Poisson 675*, Mahaboloko (Mahaboboka), 5 June 1923, st. (P); *Réserves Naturelles 1-R-324,* Canton et District de Morondava, 100 m au nord de la Station Forestière d'Ambalarao, 24 Mar. 1955, st. (P); *Réserves Naturelles, Dokobe, 11068-RN*, Canton et District d'Antsalova, 7 Oct. 1959, fl. (P); *Service Forestier 4079-SF*, Morondava, Androvaha [Androvabe ?], 18 Oct. 1951, fr. (P, TEF); *Service Forestier 12569-SF*, Morondava, Analaiva, Andranomena, JB 8, 17 Feb. 1955, fr. (P, TEF); *Service Forestier 14370-SF*, Montagne des Français, Diégo Suarez, 29 July 1955, fl. (K, MO, P, TEF, WAG); *Service Forestier 19508-SF*, Poste Belo-sur-Mer, 6 Aug. 1959, fl. (P, TEF); *Service Forestier, Rabevohitra, 29803-SF*, Morondava, Station de Betsipotika, 19 May 1980, fr. (TEF); *Service Forestier, Rabevohitra, 32037-SF*, Ville de Maintirano, 9 Feb. 1981, fr. (TEF); *Ursch 151*, Province de Diégo Suarez, s.d., fr. (P). — COMOROS: **Mayotte**: *Boivin 3453*, 1847-1852, imm.fr. (P); *Humblot 435*, s.loc., s.d., fl. (K, P); **Anjouan**: *Waterlot 897*, Domoni, July 1923, fl. (P).

E. madagascariensis is the most widespread and common species of *Erythrina* in Madagascar. It occurs throughout the lowlands of western and northern Madagascar, from the Onilahy River to the northern tip of the island, especially in the coastal plains of the Menabe from Morondava to

Maintirano. It also occurs in the Comoro Islands. Its habitat includes deciduous woodland and disturbed areas, usually on sand and often in humid or seasonally marshy habitats, sometimes coastal, at up to about 200 m altitude. It flowers in the dry season from July to October. Sometimes it is planted as cuttings to form barricades and cattle enclosures. The wood is used for fuel and to make charcoal. In the western region it is known under the vernacular names of "Manongo", "Manonga" or "Vombara", and as "Magonga" in the north.

E. madagascariensis is easily recognised by its dense, mealy indumentum of stellate hairs, its very large red flowers, its calyx forming a spathe with apical appendages, its wing petals as long as the keel and its moliniform pods with red and black bicoloured seeds.

This species was included in *E. perrieri* R. Vig. by KRUKOFF & BARNEBY (1974: 439-440), but examination of the type specimen of this latter has shown that it differs in many major characters including its bilobed calyx, its minute wing petals, its fused keel petals with an apical point, and its indumentum of simple hairs. KRUKOFF & BARNEBY (1974, as *E. perrieri*) also remarked on the similarity of this species to the poorly known *E. schliebenii* Harms ex Mildbr. from Tanzania, but they maintained them as distinct species, at least whilst the pods and seeds of *E. schliebenii* remain unknown. *E. schliebenii* also differs in its leaflets which are almost glabrous beneath, its twigs with sparse prickles, and its even more densely floccose inflorescences and calyces, but the flower structure appears to be similar.

Mucuna manongarivensis Du Puy & Labat, **sp. nov.**

M. paniculata Baker *affinis sed a valde brevioribus simplicibus que pedunculis differt; leguminibus cum transversalibus et minus interruptis alis distincta.*

TYPE. — *D.J. & B.P. Du Puy, P.P. Lowry & G. Schatz M232*, NW Madagascar, Sambirano, Manongarivo Massif, near Beraty on the track to Ankaramy, near Analanantsoa, southern slopes of Mount Maromiandra, 14°02'S, 48°13'E, ca. 70 m, 20 May 1989, fl., fr. (holo-, K; iso-, K, MO, P, TAN, WAG).

An evergreen liane 4-10 m or more tall; stems twining, glabrous except for a few hairs when very young. Stipels 3-5 mm long, persistent. Leaflets 3, ovate to elliptic, the laterals unequal-sided, 8-16 × 4.5-10.5 mm, rounded basally, the apex extended into a slender acuminate tip, sparsely and minutely hairy beneath, glabrescent above, thinly coriaceous.

Inflorescences axillary, pendulous, 15-45 cm long, long-pedunculate, not branched (in the specimens available but recorded as paniculate on the label of *Perrier de la Bâthie 4120*), the flowers produced on swollen or slightly elongated nodes towards the inflorescence apex; bracts and bracteoles oblong-elliptic, 15-27 × 8-15 mm. Flowers 55-65 mm long, greenish white (or purple ?). Calyx cup-shaped, 20-27 mm long, silvery pubescent and with appressed ginger bristles, with 4 triangular teeth, the lowest tooth ca. 15 mm long, the others 10-12 mm long, the upper tooth notched apically.

Pods oblong, 17-24 × 4.5-6 cm, with many obliquely transverse lamellae which are entire or undulating and frequently extend more than half way across the pod before they are interrupted,

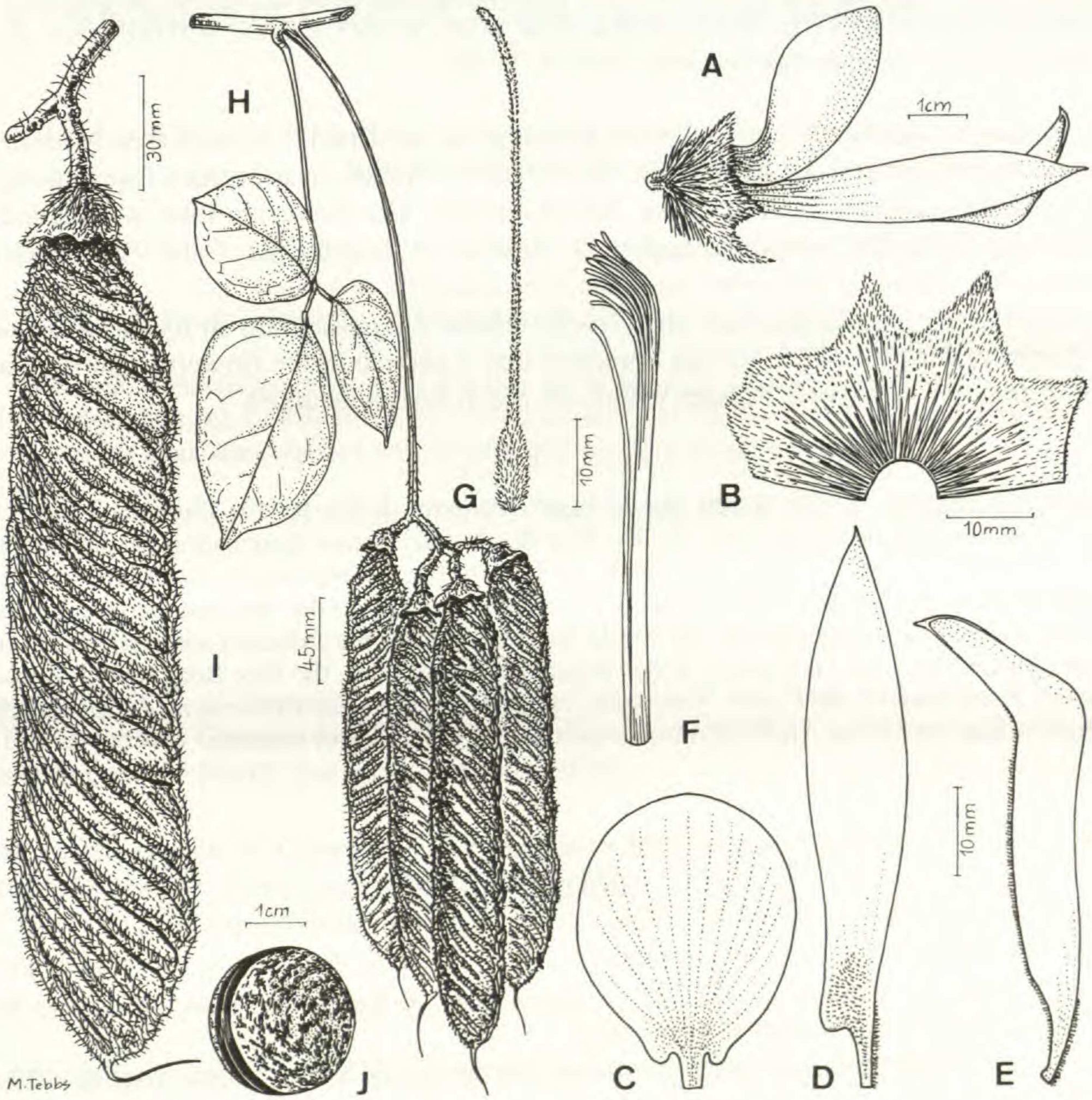

Fig. 3. — **Mucuna manongarivensis** Du Puy & Labat: **A**, fruiting habit; **B**, flower; **C**, calyx; **D**, standard petal; **E**, wing; **F**, keel; **G**, staminal sheath; **H**, ovary; **I**, pods; **J**, seed. (All drawn from *D.J. & B.P. Du Puy, Lowry & Schatz M232*, holotype, K).

very densely covered in irritant ginger bristles, with 3 or 4 seeds. Seeds subspherical, compressed, ca. 23-25 × 20-23 × 14-15 mm, mottled ginger and black; hilum very long and extending around three-quarters of the circumference of the seed.

PARATYPES. — *Decary 1567*, env. de Moramandia, Ankaramy, s.d., fl. (P); *Decary 2170*, ibid., 11 June 1923, fr. (P); *Gauthier, Chatelain & Derleth 2431,* Réserve spéciale de Manongarivo, Besinkara, 1 km à l'E d'Ambalafary, 14°04'S, 48°17'E, 350 m, 24 June 1994, fr. (G, K, MO, P, TAN, WAG); *Perrier de la Bâthie 4120*, base du Massif du Manongarivo, May 1909, fl., fr. (P).

This species is endemic to north-western Madagascar, confined to a small area bordering on the Sambirano region, around the base of the Manongarivo Massif, in evergreen forest along streams and in secondary vegetation, at up to ca. 500 m altitude. The flowering time is recorded as from March to May. It has the vernacular names of "Saribo" "Vahampimikry" and "Vahisaribo".

M. manongarivensis differs from the closely related *M. paniculata* in its inflorescences with much shorter peduncles which are not branched into a panicle in the flowering portion, and in its pods with diagonal transverse flanges which are much less interrupted.

ACKNOWLEDGEMENTS. — We would like to thank Margaret TEBBS for the illustrations, and Dr. R.M. POLHILL for his comments on the text. Dr. DU PUY thanks the Weston Foundation for the support of his research in Madagascar and at Kew, and the Royal Society for the opportunity to undertake collaborative research in the Laboratoire de Phanérogamie, Paris. We are grateful to the National Geographic Society for support with field work in Madagascar. We would also like to thank the Directors and staff of the Laboratoire de Phanérogamie, Paris, the Herbarium, Royal Botanic Gardens, Kew, the Parc Botanique et Zoologique de Tsimbazaza, Antananarivo, the Centre National de la Recherche sur l'Environnement, Antananarivo, and the Direction des Eaux et Forêts, Antananarivo, for granting permits for our research.

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section B, *Adansonia*, nos 3-4 : 235-237.

A new subspecies of *Carex* (Cyperaceae) from Somalia and Ethiopia

K.A. Lye

Summary: In the genus *Carex* a new subspecies is described, viz. *C. brunnea* Thunb. subsp. *occidentalis* Lye. *C. brunnea* was originally described from Japan, and the utricles and achenes of the holotypes of both subspecies are illustrated by SEM photographs.

Résumé : Description dans le genre *Carex* d'une nouvelle sous-espèce (*C. brunnea* Thunb. subsp. *occidentalis* Lye). *C. brunnea* a été à l'origine décrit du Japon ; les utricules et les akènes des holotypes des deux sous-espèces sont illustrés par des photographies au MEB.

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Since around 95% of Somalia consists of hyper-arid, arid and semi-arid lands, it is not unexpected that the genus *Carex* is represented by two species only. They are found in the slightly less arid mountains in the North (see Lye in Thulin 1995).

No identified species of *Carex* was recorded from Somalia by Cufodontis (1971). However, his record of *Carex sp.* from eastern British Somaliland (*Glover & Gilliland s.n.*) is probably *C. negrii* Chiov., and the record from eastern Al Madu (*Bally 10996*) is possibly *C. brunnea* Thunb. These specimens are presumably at K, but I have not been able to find them despite numerous visits.

The African mainland taxon of the *Carex brunnea* complex is here described as a new subspecies.

C. brunnea Thunberg subsp. **occidentalis** Lye, **subsp. nov.**

Subsp. nov. a subspeciebus ceteris utriculis abrupte contractis et rostris longioribus differt. Utriculi circiter 3.5 mm longi.

Type. — *Thulin et al. 8982*, Somalia, Sanaag region, Karin Xaggarood, 48°52'E, 10°58'N, 11 Jan. 1995 (holo-, UPS ; iso-, K).

A fairly slender tussocky perennial with a compact horizontal woody rhizome and numerous crowded culms. Culms 30-60 cm long and 1.0-1.5 mm thick, triangular, scabrid to subglabrous on angles. Leaves many; lower sheaths dark reddish brown with almost black nerves, sometimes splitting up into fibres; the blades to 40 cm long and 3-4 mm wide, flat, scabrid on margin and ribs particularly towards the apex. Inflorescence of 1-3 slender stalked or subsessile spikes from each of the 3-8 uppermost sheaths (depauperate specimens from dry sites with a total of 3-4 spikes only); subtending bracts leafy and mostly much longer than the spikes (but the uppermost shorter). Spikes 1-3 cm long and about 3 mm wide, consisting of 5-15 distantly set female flowers at the base and 2-6 male flowers at their tip; the male part of the spike much shorter than the female. Glumes 3-4 mm long, ovate-lanceolate, light reddish brown with a pallid 1-3-nerved somewhat scabrid midrib ending in the acute apex; male and female glumes similar, but male and upper female glumes often not scabrid. Style with two slender stigmas about 3 mm long. Utricle oval and lenticular, about 3.5 mm long and 1.2-1.3 mm wide including a prominent 0.5-0.8 mm long cuneate base and a distinct beak about 1 mm long; densely short-hairy except near the base; nerves many and prominent on both sides. Nutlet up to 2.5 mm long and 1.5 mm wide, ovate-lenticular, almost smooth, dark brown or pallid.

ECOLOGY. — Rocky gully in deep shade in evergreen bushland with *Buxus, Juniperus, Olea, Pistacia* and *Acokanthera* on limestone, or in shade of *Podocarpus* forest, 1400-2060 m.

DISTRIBUTION. — In Somalia known from the type-collection from the Sanaag region in the north only; also in Ethiopia; other subspecies or varieties in Yemen (HOOPER 1984), Madagascar, Mauritius and from India to Japan (KÜKENTHAL 1909; KERN & NOOTEBOOM 1979).

MATERIAL STUDIED. — SOMALIA: *Thulin et al. 8982*, type (UPS, K). — ETHIOPIA: *H.F. Mooney 5641*, Sidamo region, Adola, 30°E, 5°55'N, in shade of Podocarpus forest, 2060 m, 27 Jan. 1954 (K).

NOTE. — The new subspecies differs from subsp. *brunnea* from Japan particularly in the longer beak which is more abrubtly narrowed, but also in the larger and more elliptic achene (Fig. 1).

ACKNOWLEDGEMENT. — The electroscan-photography was made possible through E. REED at Laboratory of Analytical Chemistry, Department of Electron Microscopy, The Agricultural University of Norway. The photographs were taken by the author.

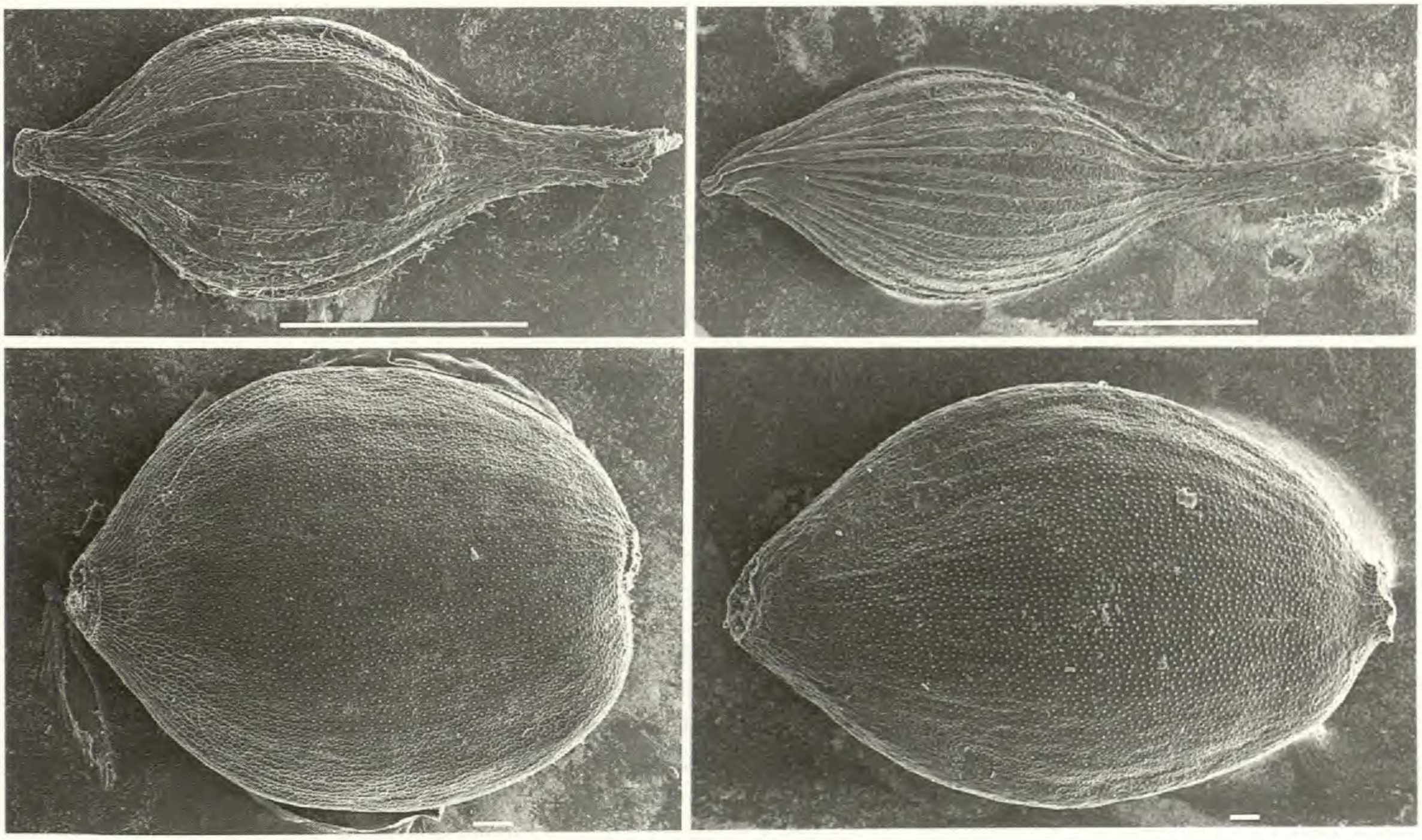

Fig. 1. — Utriculi (above, scale 1 mm) and achenes (below, scale 0.1 mm) from **Carex brunnea** Thunb. On the left, subsp. **brunnea**, from *Thunberg s.n.* (holotype). On the right, subsp. **occidentalis** Lye, from *Thulin et al. 8982* (holotype).

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